

REMARKS

The claims are 1-12 as amended above.

THE AMENDMENTS

A. To the specification

It is apparent that the original formula was in error. The propriety of the correction is supported by the fact that the incorrect formula is not reconcilable with the stoichiometry of the reactions as outlined at the arrows of the reaction scheme:

Reaction of one mole on N,N-disubstituted formamide with one mole of COCl_2 or SOCl_2 , respectively, results in the formation of one mole CO_2 or SO_2 , respectively, and one mole of Vilsmeier salt. Consequently, two chlorine atoms have to be contained in the formula of the Vilsmeier salt, whereas the oxygen originating from the formamide is required for the formation of CO_2 or SO_2 , respectively.

B. To the claims

The amendment to claim 1, line 2, "and phosgene or thionyl chloride," corrects an obvious typographical error.

The claims now require that the physical state of the HCl is "gaseous." Support for this limitation is found at page 13, lines 8-12 (in particular, line 11) and lines 34-38 (in particular line 38) as well as in the Examples.

THE REJECTIONS OVER PRIOR ART

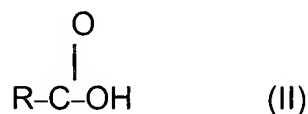
The claims were rejected under 35 USC § 102(b) over EPA 475 137, EP-A 296 404 or DD-153 867. It should be clear from the claims, at least as now amended, that

their subject matter is not anticipated by the references.

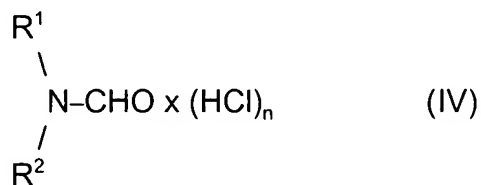
EP-A 475 137 relates to a process for preparing a carbonyl chloride of the formula I



where R is C₁-C₁₀-alkyl, C₂-C₃₀-alkenyl or C₂-C₃₀-alkynyl, from essentially equimolar amounts of a carboxylic acid of the formula II



where R has the above-mentioned meanings, and phosgene, COCl₂, (III), in the presence of a catalytic adduct of phosgene and N,N-disubstituted formamide or the hydrochlorides thereof, of the formula IV

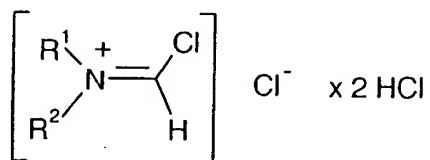
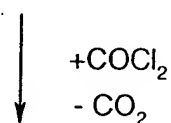
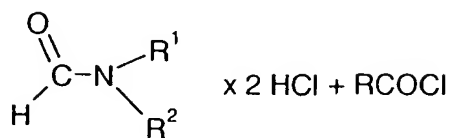
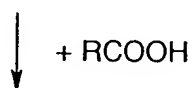
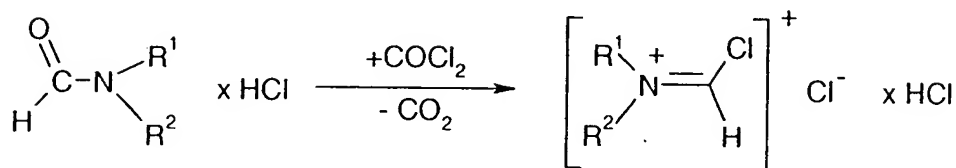
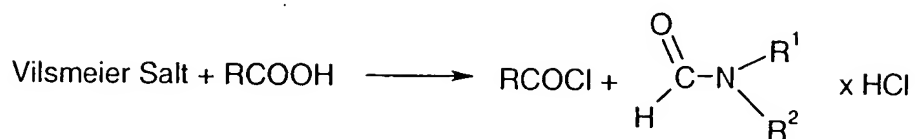
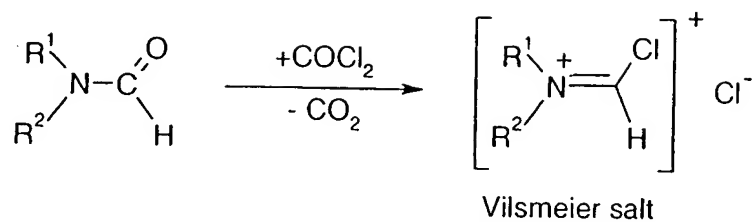


where R¹ and R² are each, independently of one another, C₁-C₃-alkyl or together are a C₄-C₅-alkylene chain which may be interrupted by oxygen or by nitrogen which carries C₁-C₃-alkyl or CHO, and n is 0, 1 or 2, wherein the reaction is carried out with a stationary phase of the catalytic adduct, and the formamide (IV) is loaded with from 0.1 to 95 mol% of phosgene.

The catalytic adduct IV of phosgene and N,N-disubstituted formamide of EP-A 475 137 corresponds to the adduct recited in the preamble of claim 1 of the instant application. Therefore, it is apparent that EP-A 475 137 does not teach the introduction of additional gaseous hydrogen chloride which is the characterizing feature of the instant invention.

The passage on page 4, lines 21-55 (including the formulas of the catalyst adduct), of EP-A 475 137 quoted by the examiner does not teach the introduction of hydrogen chloride during the reaction, either, let alone the introduction of gaseous hydrogen chloride. Instead, the quoted passage of EP-A 475 137 is completely silent with respect to any introduction of additional hydrogen chloride to the reaction mixture, comprising the reactants phosgene and carboxylic acid, the catalyst adduct or the hydrochlorides thereof, the N,N-disubstituted formamide and its hydrochlorides and the carbonyl chloride product.

In this context it should be noted that all of the formulas depicted on page 4 of EP-A 435 137 illustrate the various species of the catalyst contained in the catalyst phase present in the reactor, viz. the N,N-disubstituted formamide (IV) and its hydrochlorides as well as the catalyst adduct and its hydrochlorides. The hydrochlorides of the N,N-disubstituted formamide are generated in the course of the reaction of the carboxylic acid with the catalyst adduct to form the carbonyl chloride according to the following reaction sequence, which is also outlined in general in the reaction scheme and by the statements in the last paragraph on page 2 of the instant specification:



Accordingly, the formation of the catalyst species depicted on page 4 of EP-A 435 137

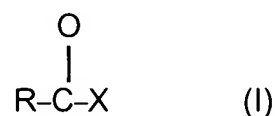
is the result of the reaction itself, but not the result of the introduction of hydrogen chloride, i.e., the feeding of hydrogen chloride, during the reaction. EP-A 435 137 in fact does not teach the introduction of hydrogen chloride during the reaction nor does it give any incentive to do so.

Apart from this, the catalyst species on page 4 of EP-A 435 137 are hydrochlorides, i.e., salts, and, hence, are different from the free hydrogen chloride introduced according to the instant invention.

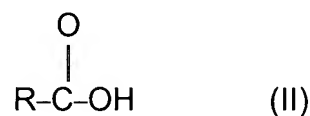
From the foregoing it is evident that claim 1 as filed is already clearly distinguished from the subject matter of EP-A 435 137 in that it teaches the measure of purposefully introducing, i.e., feeding hydrogen chloride into the reaction mixture already containing *inter alii* the catalyst and the catalyst adducts generated as a result of the reaction of phosgene with the N,N-disubstituted formamide and the subsequent reactions of the catalyst adduct with the carboxylic acid to produce the carbonyl chloride and the hydrochlorides of the N,N-disubstituted formamide and of the catalyst adduct. EP-A 435 137 does not teach such a measure and consequently the subject matter of the instant application is novel and not anticipated by this reference. In this context applicants would like to emphasize that the generation of the catalyst hydrochlorides depicted by the formulas on page 4 of EP-A 435 137 as a result of the reaction sequence outlined above naturally occurring in the reaction mixture is evidently distinct from and not encompassed by the measure of purposefully introducing, i.e., feeding, free hydrogen chloride (to the reaction mixture) during the reaction as it is recited by

instant claim 1. In order to further clarify this issue, applicants have inserted the word "gaseous" into amended claim 1.

EP-A296 404 relates to a process for preparing a carbonyl halide of the formula I



where R is an organic radical of more than 7 carbon atoms and X is chloride or bromine, by reacting a carboxylic acid of the formula II



where R has the abovementioned meaning, with a phosphorus chloride or bromide, which comprises treating this reaction mixture with a carboxamide-hydrochloride or -hydrobromide mixture which is not homogeneously miscible with the carbonyl halide I, and then separating off the carboxamide hydro chloride or hydrobromide phase.

The process of EP-A 296 404 is discussed in detail by the specification of the instant application. As is pointed out in the passage reaching from page 1, line 29 to page 2, line 8, EP-A 296 404 describes the purification of crude carbonyl chlorides which originate from the chlorination using phosphorus trichloride, in which the reaction product is treated with carboxamide hydrohalides. The chlorination reaction, however, is carried out in the absence of such carboxamide hydrohalides solely with the aid of the chlorinating agent phosphorus trichloride.

Accordingly, it is apparent that the instantly claimed process is novel and not anticipated by the teaching of EP-A 296 404 in that it used phosgene (COCl_2) instead of phosphorus trichloride (PCl_3), and carries out the chlorination reaction in the presence of a catalyst adduct, generated by the reaction of phosgene with an N, N-disubstituted formamide, which is not present in the chlorination reaction taught by EP-A 296 404, and in that it introduces hydrogen chloride during the chlorination reaction (but not in an after treatment purification step) and in that, as a consequence of the foregoing, it is carried out in a single step without the need of an aftertreatment step for purification of the carbonyl halides produced as it is the characterizing feature of the process of EP-A 296 404. It is evident that the claim language of the claims as filed clearly distinguishes the process according to the instant invention from the subject matter disclosed by EP-A 296 404.

The instantly claimed process is also novel and not anticipated by the disclosure of DD-153 867 which teaches a two-step process for the manufacture of carbonyl chlorides, wherein in the first step a carboxylic acid is chlorinated with the aid of the chlorinating agents phosphorus trichloride or thionyl chloride in the absence of any N, N-disubstituted formamide or any catalyst adduct generated therefrom, wherein after the first step a by-product containing phase is separated off from the product phase and wherein the product phase in a second step is chlorinated to almost complete formation of the carbonyl chloride with the aid of the said chlorinating agents and in the absence of any N,N-disubstituted formamide or any catalyst adduct generated therefrom but

optionally ("ggf." = "gegebenenfalls") in the presence of hydrogen chloride.

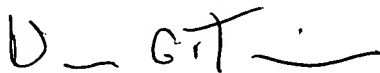
Hence, the instantly claimed process is distinguished from the teaching of DD-153 867 in that it requires the presence of a catalyst adduct generated by the reaction of phosgene with an N,N-disubstituted formamide and in the it is a one-step process not requiring the intermediate removal of a by-product phase.

Accordingly, allowance is respectfully solicited.

Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees to Deposit Account No. 11-0345. Please credit any excess fees to such deposit account.

Respectfully submitted,

KEIL & WEINKAUF

A handwritten signature in black ink, appearing to read "D. G. T." followed by a horizontal flourish.

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